

REMARKS

Claims 1-40 are pending in the application. Claim 20 is amended and new claim 41 is added by the present amendment. Applicant respectfully submits that no new matter is added by the present amendment. Support for the amended claim and new claim can be found, for example, at page 7, lines 23 – 26 of the specification.

Rejections Under 35 U.S.C. §103

The Patent Office rejected claims 1-40 under 35 U.S.C. §103(a) over U.S. Patent No. 5,430,825 to Leaman et al. (hereinafter referred to as "Leaman") in view of in view of U.S. Patent No. 4,681,656 to Byrum (hereinafter referred to as "Byrum"), U.S. Patent No. 5,913,002 to Jiang (hereinafter referred to as "Jiang"), U.S. Patent No. 6,263,220 to Mansour (hereinafter referred to as "Mansour"), U.S. Patent No. 4,744,627 to Chande et al. (hereinafter referred to as "Chande"), U.S. Patent No. 4,695,760 to Anthony et al. (hereinafter referred to as "Anthony"), U.S. Patent No. 5,905,831 to Boudreau et al. (hereinafter referred to as "Boudreau"), U.S. Patent No. 5,259,054 to Benzoni et al. (hereinafter referred to as "Benzoni"), U.S. Patent No. 5,483,611 to Basavanhally (hereinafter referred to as "Basavanhally"), U.S. Patent No. 3,864,018 to Miller (hereinafter referred to as "Miller"), and U.S. Patent No. 5,853,626 to Kato (hereinafter referred to as "Kato"). Applicant respectfully traverses the Patent Office's rejections of claims 1-40 under 35 U.S.C. 103(a).

For claims 1-36 and 40, the Patent Office indicated that Leaman discloses sticks 12, 14 with notches. The Patent Office also indicated that it would be obvious to form the sticks along with the grooves from a large sheet by use of laser cutting since machining by laser is well known, citing Anthony, Mansour and Byrum as examples. After carefully studying Leaman, Anthony, Mansour and Byrum alone and in combination, Applicant's attorney could not find any teaching or suggestion of the claimed elements including etched sticks having notches "wherein the notches have surfaces that are directionally dry etched sidewall surfaces formed by directional dry etching perpendicular to the front surface." (Claims 1-19, 36). Rather, Leaman

discloses "inserts 12 and 14" wherein "(a)ll that is required is that the inserts 12 and 14 have surfaces a plurality of semi-circular slots 16 that can be joined together. The inserts 12, 14 can be made from aluminum or other metals with the slots being cut from the surface; however, it is preferable that the inserts be formed from a molded plastic such as polyvinylchloride, polypropylene, ABS, polystyrene, etc." (Col. 2, lines 35-42). Applicant respectfully submits that the Leaman inserts disclosed as being cut from metal or molded of plastic are distinct from the precision process of etching that is as claimed in 1-40 the present invention. When considered alone, the coarsely dimensioned inserts disclosed in Leaman do not teach or suggest the features of precisely etched sticks claimed in the present invention.

Although the Anthony, Mansour and/or Byrum patents provide examples of laser cutting notches, they do not teach or suggest "etched sidewall surfaces formed by directional dry etching perpendicular to the front surface" as claimed in the present invention. Applicant respectfully submits that the element of sidewall surfaces of notches etched in a direction perpendicular to the front surface is essential to provide the advantage of accurate stack spacing because "(t)hickness 26 is determined by a thickness of the wafer used to make the etched sticks." FIG. 2, Spec. page 8, lines 9-10.

Similarly, Applicant's attorney reviewed the Kato and Jiang patents and could not find a teaching or suggestion therein or even a hint to notches having "etched sidewall surfaces formed by directional dry etching perpendicular to the front surface" as claimed in the present invention. Applicant submits that impermissible hindsight would be necessary to combine the Kato and Jiang patents so as to discover the claimed element of etching notches perpendicular to the front surface such that the optical fibers in the array extend parallel to the wafer thickness.

"In order to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must be found in the prior art and not based on Applicant's disclosure." MPEP 2142 citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

With respect to claims 20-35, Applicant respectfully submits that claim 20 is amended herein to more clearly define the invention. Claim 20 as amended explicitly claims the wafer thickness being in the direction of the optical fiber, which provides the advantage of removing thickness variation from the dimensional stack in the 2-D fiber array. Applicant's attorney studied the cited patents alone and in combination and could not find a teaching or suggestion of each of the elements of claim 20 as amended. Specifically, Applicant's attorney could not find in the cited patents, alone or combined, the claim element "said sticks are etched from a wafer having a wafer thickness direction such that said wafer thickness direction is parallel to said optical fiber disposed in said cage."

Similarly, with respect to claim 40, Applicant's attorney studied the cited patents alone and in combination and could not find therein a teaching or suggestion of the claimed element "so that the optical fibers are oriented essentially parallel with the directional dry etching direction."

With respect to claims 5-11, the Patent Office indicated that the "stick surfaces (edges) according to Leaman are readable of being cleaved. The Patent Office also indicated that it would have been obvious to form the Leaman sticks, prior to notching, from a stamped sheet as in Miller or from a large sheet as in Byrum, Fig. 5, or Boudreau, Fig. 5.

Although sticks having notches certainly can be cut from large sheets in an obvious manner according to the cited references, Applicant submits that such sticks are distinct from the claimed stick elements according to the present invention. Contrary to the Patent Office's characterization, Applicant's attorney could not find in Leaman, Miller, Byrum or Boudreau considered alone or any combination thereof, teachings or suggestions of the claimed etched sticks "wherein the notches have surfaces that are directional dry etched sidewall surfaces formed by directional dry etching perpendicular to the front surface". Applicant respectfully submits that this claimed element provides the featured alignment of fibers parallel to the wafer thickness thereby taking thickness variations out of the tolerance stack when sticks are stacked.

Further with respect to claims 5-11 the Patent Office indicated that it is obvious to use alignment means of Chande at 27, or Basavanhally at 16, or alignment recess bumps as in Kato at 4 (and corresponding recesses in sticks 1, 1a) and Jiang at 301 or as in Benzoni at 20, 16, 24. The Patent Office also indicated that it is obvious to form the sticks with notches on both sides as in Miller. Applicant respectfully submits that claims 5-11 are not obvious for the reasons set forth hereinbefore with respect to claims 1-36.

Applicant respectfully submits that for the reasons set forth above, the Patent Office has not made out a case of prima facie obviousness under 35 U.S.C. 103(a). Accordingly, the rejection of claims 1-36 and 40 under 35 U.S.C. 103(a) should be withdrawn.

The Patent Office indicated that "(f)or claim 37, and also for other claims, it would have been obvious to form the Leaman sticks 12, 14 from a single sheet or block as in Byrum, Boudreau, fig. 5, and Kato, fig. 9, to etch holes by laser in Byrum, Anthony, etc... and then to cut or divide the sheet along "the line of holes" as in Boudreau, figs. 5, 6, Kato, fig. 9 and Byrum. The fibers would then be clamped between such sticks. Miller applied as above."

Applicant's attorney studied Leaman, Byrum, Boudreau, Kato, Anthony and Miller alone and in combination and, contrary to the Patent Office's characterization, could not find any teaching or suggestion of each of the claimed elements in claim 37 or any other claim in the present application. Specifically, no teaching or suggestion could be found of the claimed method for making a two dimensional optical fiber array by a) forming a perforated chip with a 2 dimensional pattern of holes; b) cleaving into sticks along lines of holes; and c) stacking the etched sticks with optical fibers disposed in resulting notches. Even if stacked etched chips are known, for example as in Miller, to form optical fiber arrays, and/or perforating wafers with 2 dimensional arrays are known, for example as in Anthony, the combination of steps as claimed in claim 37 could not be found in these patents. Applicant submits that the combination of elements as claimed provide the advantage of efficiently eliminating dimensional variation, for example, as caused by variations in wafer thickness. Applicant respectfully submits that this and other advantages of the claimed method can not be achieved by combining any of the cited patents.

For the reasons set forth above, Applicant respectfully submits that the Patent Office has not made out a case of prima facie obviousness under 35 U.S.C. 103(a). Accordingly, the rejection of claims 37-39 should be withdrawn.

The Patent Office indicated that, alternative to a 35 U.S.C. 102(b) rejection (see below), claims 20-36 are rejected under 35 U.S.C. 103(a) as obvious over Basavanhally or Kato either one alone or with Chande. Although, the Basavanhally fiber support members 17-18 and the Kato chips 1a, 1b, are etched to form notches, Applicant's attorney could not find in Kato, Basavanhally nor Chande alone or combined any teaching or suggestion of the claimed element "wherein the etched sticks have top and bottom surfaces, and the top and bottom surfaces are cleaved surfaces." Contrary to the Patent Office's characterization, the term "cleaved" as claimed does structurally define the surfaces of such sticks, because cleaved top and bottom surfaces as claimed in claims 20-36 keep the wafer thickness variation in the direction parallel to optical fibers, and out of the 2-dimensions of stacking.

Furthermore, claim 20 is amended herein to further define the invention by adding the term "wherein said sticks are etched from a wafer having a wafer thickness direction such that said wafer thickness direction is parallel to said optical fiber disposed in said cage."

For the reasons set forth above, Applicant respectfully submits that the Patent Office has not made out a case of prima facie obviousness under 35 U.S.C. 103(a). Accordingly, the rejection of claims 20-36 should be withdrawn.

The Patent Office rejected claims 1-40 under 35 U.S.C. 103(a) as being unpatentable over Kato in view of Byrum, Jiang and Chande. Applicant respectfully traverses the Patent Office's rejections for the reasons set forth hereinbefore with respect to claims 1-40.

Particularly, with respect to claims 1-19 and 36, after carefully studying Kato, Byrum, Jiang and Chande alone and combined, Applicant's attorney can find no teaching or suggestion of the claimed element "wherein the notches have surfaces that are directional dry etched sidewall surfaces formed by directional dry etching perpendicular to the front surface." With respect to claims 20-35, Applicant respectfully submits that no teaching or suggestion could be

found in the cited patents alone or combined for the claimed element "wherein the etched sticks have top and bottom surfaces, and the tops and bottom surfaces are cleaved surfaces" or as amended "wherein said sticks are etched from a wafer having a wafer thickness direction such that said wafer thickness direction is parallel to said optical fiber disposed in said cage." With respect to claims 37-39, Applicant respectfully submits that no teaching could be found in the cited patents alone or combined for the steps including: a) forming a perforated chip with a 2 dimensional pattern of holes; b) cleaving into sticks along lines of holes; and c) stacking the etched sticks with optical fibers disposed in resulting notches. With respect to claim 40, Applicant respectfully submits not teaching or suggestion could be found in the cited patents for the claimed element "wherein the optical fibers are oriented essentially parallel with the dry etching dimension."

For the reasons set forth above, Applicant respectfully submits that the Patent Office has not made out a case of prima facie obviousness under 35 U.S.C. 103(a). Accordingly, the rejection of claims 1-40 over Kato in view of Byrum Jiang and Chande should be withdrawn.

The Patent Office rejected claims 1-40 under 35 U.S.C. 103(a) over Miller in view of Byrum, Kato, Boudreau and Chande. For the reasons set forth hereinbefore with respect to claims 1-40, Applicant respectfully traverses the rejections of claims 1-40 under 35 U.S.C. 103(a) over Miller in view of Byrum, Kato, Boudreau and Chande. Particularly, Applicant respectfully submits that the claim limitations set forth hereinbefore provide the advantage of eliminating the contribution of dimensional variations in wafer thickness from the two dimension of the 2-dimensional optical array. Applicant's attorney could not find any teaching or suggestion of this advantage in any combination of the cited patents without using impermissible hindsight.

Applicant respectfully submits that the Patent Office has not made out a case of prima facie obviousness under 35 U.S.C. 103(a). Accordingly, the rejection of claims 1-40 over Miller in view of Byrum, Kato, Boudreau and Chande under 35 U.S.C. 103(a) should be withdrawn.

Rejections under 35 U.S.C. 102(b)

The Patent Office indicated that claims 20-36 are rejected under 35 U.S.C. 102(b) as anticipated by Basavanhally or Kato. Applicant respectfully traverses the Patent Office's rejection of claims 20-36 under 35 U.S.C. 102(b).

Applicant respectfully submits that Applicant's attorney studied the Basavanhally and Kato patents and, contrary to the Patent Office's characterization, could not find any teaching or suggestion therein of the claimed element "wherein the etched sticks have top and bottom surfaces, and the top and bottom surfaces are cleaved surfaces." (Claim 20). Rather, Basavanhally recites "(t)he optical fiber support member 11 comprises first and second fiber support elements 17 and 18 into which V-grooves have been etched for support of the optical fibers 13. The support members are made of monocrystalline material such as silicon into which the V-grooves are made by photolithographic masking and etching." (Col. 2, lines 51-56). Applicant's attorney found no cleaved surfaces disclosed in Basavanhally. Similarly, no cleaved surfaces were found in Kato.

Furthermore, Applicant respectfully submits that claim 20 is amended herein to more clearly define the invention. Specifically, claim 20 as amended recites "wherein said sticks are etched from a wafer having a wafer thickness direction such that said wafer thickness direction is parallel to said optical fiber disposed in said cage."

Applicant respectfully submits that claims 20-36 as amended are not anticipated by the Kato patent or the Basavanhally patent. Accordingly, the Patent Office's rejections of claims 20-36 should be withdrawn.

Response to Suggested Amendments

The Patent Office indicated that claim limitations at issue should be discussed in terms of new results or advantages produced thereby. Applicant respectfully submits that claim limitations are discussed herein in terms of their advantages. See, for example, page 7, lines 23-26. Applicant further submits that the present amendment to claim 20 as discussed hereinbefore

more clearly defines the invention according to its advantages. Similarly, new claim 41 recites "wherein said etched sticks are formed from a wafer having a wafer thickness direction and wherein said optical fiber extends in a direction parallel with said wafer thickness direction" which more clearly defines the invention in terms of its advantages.

The Patent Office is invited and encouraged to telephone the undersigned with any concerns in furtherance of the prosecution of the present application.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such action is hereby solicited. If any points remain in issue which the Patent Office feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

Enclosed with this response is a Power of Attorney (and Revocation of Previous Power of Attorney).

Please charge any deficiency as well as any other fees which may become due at any time during the pendency of this application, or credit any overpayment of such fees to deposit account No. 50-0369. Also, in the event any extensions of time for responding are required for the pending application(s), please treat this paper as a petition to extend the time as required and charge deposit account No. 50-0369 therefore.

Application No. 09/615,101
Filed: July 13, 2000
Group Art Unit: 2839
Confirmation No: 4072

Respectfully submitted,

Sept. 4, 2002
Dated:

Joseph P. Quinn
Joseph P. Quinn
Reg. No. 45,029
Customer No. 21710
Attorney for Applicant
BROWN RUDNICK BERLACK ISRAELS LLP
Box IP, 18th Floor
One Financial Center
Boston, MA 02111
Tel: 1-617-856-8396
Fax: 1-617 856-8201

APPENDIX I

20. (Amended) An apparatus for aligning optical fibers in a 2-dimensional array, comprising:

a) a plurality of etched sticks each having a notch and a front surface, wherein the etched sticks are stacked so that the notch forms a cage;

b) an optical fiber disposed in the cage and oriented perpendicular to the front surface; wherein the etched sticks have top and bottom surfaces, and the top and bottom surfaces are cleaved surfaces[.]; and

wherein said sticks are etched from a wafer having a wafer thickness direction such that said wafer thickness direction is parallel to said optical fiber disposed in said cage.